REMARKS

1. Eppler in view of Bujard

Claims 13 to 14 and 20 to 21 were rejected as obvious under 35 U.S.C. 103 (a) over R. Eppler, et al, US Patent 5,783,506, (referred to herein below as "Eppler"), in view of P. Bujard, US Patent 7,291,216, (referred to herein below as "Bujard").

Eppler discloses a ceramic glaze for a glass ceramic article, such as a tile, containing uncoated mica flakes **and** a pearlescent pigment, namely titanium-oxide coated mica flakes (column 1, lines 5 to 10, and column 3, lines 1 to 15).

The final Office Action on page 3 admits that Eppler does **not** disclose the metal-oxide-coated silicon dioxide flakes. According to page 3 of the Office Action Bujard teaches platelet-shaped "color flop" pigments that have a silicon dioxide core are coated with metal oxides including titanium dioxide, among others, and can be included in glazes for ceramics and glass (abstract). Table 2 in column 21 of Bujard does include data that shows that their pigments exhibit color flop or that the observed color changes with viewing angle.

Page 3 of the final Office Action goes on to state that the pigments of Bujard could be included in the glaze of Eppler and argues that the availability of the pigments of Bujard provides the opportunity for glazes of different colors and appearances, which would be enough motivation for one of ordinary skill in the art to include them in the glaze with the pigments of Eppler.

In contrast to the description of the platelet-shaped pigment particles of Bujard on page 3 of the Office Action, they do **not** consist of a "core of silicon dioxide". The core particles that are coated with titanium dioxide in some embodiments of Bujard consist of one or more layers obtained by calcination of a composite layer of SiO_x **and** a metal, preferably aluminum (claims 1, 7, and 8; step b of the process described in lines 3 to 12 of column 2). The term "a layer comprising SiO_x and a metal" means a single composite layer in which a metal is embedded in a matrix of SiO_x (column 2, lines 26 to 30). The value of x is from 0.03 to 2.0, so that the preferred matrix is not silicon dioxide (SiO_2) (claim 3). See also column 11, lines 1 to 9, of Bujard.

Thus the core platlets of Bujard are **not** platlets that consist of SiO_2 as stated in the final Office Action, but instead SiO_x-coated **metal platlets** (column 11, lines 17 to 19). This portion of Bujard also discloses embodiments in which the SiO_x-coated **metal platlets** are coated with TiO_2 (applicants' preferred metal oxide coating) by physical or chemical vapor deposition or by wet chemical coating techniques.

In contrast claim 13 states that the "special-effect pigment" **consists of** synthetically produced silicone dioxide platelets coated with at least one metal oxide. This clearly excludes core platelets that consist of SiO_x-coated **metal platlets**, wherein x is from 0.03 to 2.0, according to claims 1 and 8 and columns 2 and 10 of Bujard.

This means the layers of the core platelets are produced from SiO_x and metallic aluminium, which are then coated with TiO_2 to obtain the metal oxide

coated SiO_x-coated metal platlets of Bujard. The weight ratio of Al to SiO_x is about 1 : 1 according to Bujard. The reflecting element is the metallic aluminium. The non-oxidizing atmosphere is necessary otherwise the metallic aluminium would be rapidly oxidized and the resulting layer would not have the desired properties. Even if the SiO_x with x = 0.03 to 2.0 reacts with the aluminum under the non-oxidizing atmosphere during calcinations, the result is **not** a core particle that consists of silicon dioxide as claimed in applicants' claim 13, but instead a core particle that comprises aluminum oxide and various silicon oxides, but not SiO_2.

In contrast the decorated glass ceramic article according to applicants' claim 13 is made by firing in an oxidizing atmosphere to melt-fuse the ceramic paint comprising the pigment into the glass ceramic cooking panel. In subsequent use as a cooking panel in a kitchen, the claimed article will be heated to high temperatures, even up to 700°C, and must withstand thermal shocks as well. Since the decorated areas of the cooking panel are heated up over and over in an oxidizing atmosphere (air) for cooking, the ceramic paints for this application must be extremely resistant to high temperatures and oxidation. Their chemical structures may be subject to repeated thermal load in practice. Otherwise color changes or discoloration would be noticed in the most often used cooking areas of the cooktop panel. Thus the core platelets cannot contain oxidizable elements such as aluminum or any products of calcinations of the composite layer that are oxidizable as in the case of the core platelets of Bujard.

Perhaps one could modify the glaze of Eppler by including the titanium dioxide coated pigment platelets of Bujard, but the result would not be the decorative paint or colorant of applicants' claim 13, because, as explained above, the core platelets are chemically and structurally different from the synthetically produced plane-parallel silicon dioxide platelets of Merck because they comprise a composite layer of SiO_x with x = 0.03 to 2.0 and a metal. As already mentioned, the decorative layer that includes the metal oxide coated silicon dioxide platelets on the cooktop panel is extremely thin, namely 3 -5 μm. If part of the decorating effect is achieved by paint with the composition of Bujard, the base metal will be oxidized sooner or later whether it is coated by a TiO_2-layer or not. This results in gradual changes in appearance of the decorative layer over long periods of time, which are unacceptable in many applications.

There is nothing in the prior art that would suggest that the decorative paint of Eppler should be modified by including the SiO_x-coated **metal platlets, which are coated** with a metal oxide, such as titanium dioxide. When the prior art does not suggest the modifications of the combined disclosures that lead to the claimed invention, there is no justifiable basis for a rejection under 35 U.S.C. 103 (a) based on the combined disclosures. For example, the Federal Circuit Court of Appeals has said:

> "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.... It is impermissible to use the claimed invention as an instruction manual or "template" to piece

together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that "one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention." ***In re Fritch***, 23 U.S.P.Q. 2nd 1780, 1783-84 (Fed. Cir. 1992).

In other words, there is nothing in the prior art that would lead one to replace the core particles of Bujard, namely the SiO_x-coated **metal platelets** that include aluminum metal as well as SiO_x with x = 0.03 to 2.0, with the **silicon dioxide platelets** of the applicants' disclosure and applicants' claim 13.

Furthermore Bujard's metal coated pigment platelets with its oxidazable base layer including both SiO_x and aluminum is in no way suited to be included in the glaze of Eppler when the glaze is used to make a decorative layer on a cooking surface as claimed in applicants' dependent claim 22. One skilled in the art would not include Bujard's pigment platelets in the glaze of Eppler if the decoration is provided on a glass or glass ceramic cooking panel. Eppler needs a large amount to uncoated mica (up to 10 %, column 3, lines 27 - 29), which dissolves in the glaze (column 2, lines 31 - 33) and works as a sacrificial compound which protects the pigments by its dissolution (column 3, lines 21 - 24). In addition, all examples of Eppler include tetrasodium pyrophosphate as suspending agent. The presence of a suspending agent in the decorative paint according to the present invention would damage the surface of the decorated glass ceramic panel by diffusion and compound forming (phosphate glass) with the glass ceramic, whereby the strength and the temperature-cycle stability is

affected. However the longtime mechanical stability of the decorated glass ceramic article is a vital and absolutely essential property for a cooktop application.

The combination of Bujard with Eppler is a combination of an unsuitable pigment with an unsuitable glaze. No person skilled in the art would make such a combination.

There are some additional reasons that the above-mentioned obviousness rejection should be withdrawn. These reasons are supported by disclosures in the Tech Notes of New York SCC (New York Society of Consmetic Chemists, a chapter of the National Society of Cosmetic Chemists). The article has been published in the Tech Notes of Cosmetiscope November 2004 and can be easily retrieved under http://www.myscc.orq/cosmetiscope/ techarchives.html and then clicking onto November 2004. Furthermore a copy of this article was filed with the previous amendment. In Cosmetiscope Nov. 2004 (herein after referred to as SCC) the advantages of metal oxide coated synthetically produced plane parallel SiO_2 pigments, in addition to the thermal stability described above, are summarized as follows:

a) **Color**:

On SCC page 2, paragraph 4 the article clearly states that the synthetically produced SiO_2 pigments are free of impurities, such as iron oxide which result in a yellow color shade. In contrast, impurities in natural basic material for pigment flakes of the prior art result in a yellow color shade. The

synthetically produced pure SiO_2 flakes result in clear neutral silver or depending on the pigment coating in a desirable pale complementary transmission color.

b) **Brilliance**

Due to the unavoidable uneven delamination of the layers of the pigment particles of Bujard "steps" result on the flake surface and particle thickness within each flake varies (SCC, page 2, para. 5). These "steps" (as well as plate edges) reduce the direct light reflection from the coated surface, i.e. reduce brilliance which is indispensable in the case of the present invention.

c) **Color flop**

In addition multiple thickness variations reduce the intensity of interference effects, i.e. they cause a whitening of the reflected color and decrease the intensity of the observed color flop or color change. The color change however is essential to the present invention. Especially the very thin layers (3-5 μm) used to decorate glass ceramic panels used for cooktops badly need a very strong color flop effect on each flake so that the color flop effect is observable. Further because of the narrow thickness distribution and the higher purity of the synthetic silicon dioxide flakes of applicants' claim 13, all layers of a coated silicon flake influence the interference of the reflected light resulting in dramatic strong color flop effects.

Thus the applicants' pigments, as claimed in claim 13, have better color, brilliance and color flop intensity than the pigments according to Bujard.

For the foregoing reasons withdrawal of the rejection of claims 13 to 14

and 20 to 21 as obvious under 35 U.S.C. 103 (a) over R. Eppler, et al, US Patent 5,783,506, in view of P. Bujard, US Patent 7,291,216, is respectfully requested.

2. de Witzmann in view of Bujard

Claims 13 to 14 and 19 to 22 were rejected as obvious under 35 U.S.C. 103 (a) over C. de Witzmann, et al, U.S. Patent 6,794,020 (referred to as "de Witzmann" herein below), in view of P. Bujard, US Patent 7,291,216 (referred to herein below as "Bujard").

De Witzmann does disclose a glass flux for the decorative layer that has exactly the same composition as the claimed range in applicants' claim 19.

However the final Office Action **admits** that de Witzmann does **not** teach or suggest the use of the metal oxide coated silica pearlescent pigments of applicants' independent claim 13.

Bujard cannot be combined with de Witzmann to obtain the decorated glass or glass ceramic article as claimed in applicants' independent claim 13 for the same reasons as in the case of the above obviousness rejection based on a combination of the disclosures of Eppler and Bujard. The detailed explanation of the content of Bujard and its relationship to the claimed invention in the above section 1 is incorporated here by reference.

First and foremost, the applicants' synthetically produced silicon dioxide flakes that are coated with a metal oxide have a different composition and structure from the core particles or flakes of Bujard. Applicants' claim 13 claims a

silicate melt that contains a special-effect pigment that consists of synthetically produced pure SiO_2 flakes coated with the metal oxide, whereas the pigment of Bujard consists of SiO_x-coated **metal platlets** that include a metal, preferably Al, as well as SiO_x with x = 0.03 to 2.0 according to Bujard.

Next the pigment of Bujard does not provide the desired long-term temperature resistance that the applicants' pigment provides because the pigment of Bujard contains oxidizable species, especially aluminum, that lead to discoloration during long-term usage at high temperatures.

Furthermore the applicants' pigments, as claimed in claim 13, have better color, brilliance and color flop intensity than the pigments according to Bujard.

Thus if the subject matter of Bujard is combined with that of de Witzmann the result is not the decorated glass or glass ceramic article of applicants' claim 13, but instead is a glass or glass ceramic article that has a decoration with different composition and properties from that of claim 13.

Furthermore the prior art does not provide any reasons for modifying the combined subject matter of de Witzmann and Bujard to arrive at the invention as claimed in applicants' claim 13. There is no suggestion in these prior art references to replace the core particles of Bujard that are coated with the metal oxide with those of the applicants. There are significant non-trivial differences between the core flakes of the applicants and those of Bujard as outlined above.

Bujard teaches the use of a pigment, which contains easily oxidazable components and which is stable at high temperatures only under non-oxidizing conditions. In contrast the pigments of claim 13 are stable at high temperature.

For the foregoing reasons withdrawal of the rejection of claims 13 to 14 and 19 to 22 as obvious under 35 U.S.C. 103 (a) over C. de Witzmann, et al, US Patent 6,794,020, in view of P. Bujard, US Patent 7,291,216, is respectfully requested.

3. Eppler in view of Bujard and the Merck Product Sheets Describing the COLORSTREAM® Pigments

Claims 15, 16, and 18 were rejected as obvious under 35 U.S.C. 103 (a) over R. Eppler, et al, US Patent 5,783,506, (referred to herein below as "Eppler"), in view of P. Bujard, US Patent 7,291,216, (referred to herein below as "Bujard"), and further in view of Merck in "COLORSTREAM T20-02 WNT Arctic Fire Product Information".

Claims 15 and 17 were rejected as obvious under 35 U.S.C. 103 (a) over R. Eppler, et al, US Patent 5,783,506, (referred to herein below as "Eppler"), in view of P. Bujard, US Patent 7,291,216, (referred to herein below as "Bujard"), and further in view of Merck in "COLORSTREAM T20-03 WNT Tropic Sunrise Product Information".

Bujard contains teaching that would lead one skilled in the prior art away from the claimed invention because Bujard teaches a pigment consisting of SiO_x-coated **metal platlets** that include a metal, preferably Al, as well as SiO_x with x = 0.03 to 2.0. Claim 13 requires that the pigment consists of silicon dioxide flakes that are coated with a metal oxide. Thus the pigments of the applicants' claimed invention have a different structure from those of Bujard.

A reference that leads away from the claimed invention should not be combined with another prior art reference to reject the claimed invention under 35 U.S.C. 103 (a). MPEP 2145 X. D. For example, the Federal Circuit Court of Appeals has said:

> "In determining whether such a suggestion [of obviousness] can fairly be gleaned from the prior art...It is indeed pertinent that these references teach against the present invention. Evidence that supports, rather than negates, patentability must be fairly considered." ***In re Dow Chemical Co.,*** 837 F.2nd 469,473, 5 U.S.P.Q.2d 1529, 1532 (Fed.Cir. 1988)

For all the reasons set forth in sections 1 and 2 one skilled in the glass arts would not combine Bujard with Eppler to arrive at the subject matter of claim 13.

Furthermore it was not readily apparent at the time the present invention was made that the Merck pigments described in the Product Sheets could be included in the glass flux of the present invention to provide a decorative layer on the glass or glass ceramic article that would have the desirable properties that are described above, especially the long-term resistance to discoloration or color change on repeated heavy thermal loads, that makes the decorated glass or glass ceramic article especially good for cooktop applications.

One skilled in the glass arts would not have employed the Merck pigments in the glass flux because the product sheets state that the pigments are stable up to 230°C. This would be understood to mean that no modifications of the pigment occur in a temperature range up to 230°C under a heat load.

The Office Action on page 12 suggests that this statement regarding heat

stability in the product sheets of Merck gives no indication of whether or not the pigment is stable at temperatures over 230°C. Applicants respectfully disagree.

The statement of the upper limit of 230°C would suggest to one skilled in the art that the pigment is unstable to some extent above this upper limit. Otherwise what would the reason be for stating that the upper limit is 230°C? Something must happen above 230°C. In fact, one skilled in the art would be certain that this type of pigment flake would not be stable at some temperature above 230°C because it would eventually melt at high enough temperatures.

Furthermore a prior art reference is usually cited for what it teaches or suggests, not for what it does not teach.

The Merck data sheets do **not** teach or suggest that the decorated glass or glass ceramic article could successfully experience repeated high heat loads above 230°C, such as those experienced by a glass ceramic cooktop, without discoloration or delamination of the decoration after long-term usage. The Merck data sheets do not suggest that their disclosed pigments would stand up to high temperatures well above 230°C.

The applicants do not need to provide that their decoration would withstand such high heat loads because the Merck data sheets do not disclose their decorative layer or paint and state that it would withstand such high heat loads. They only disclose the pigments and their properties.

In other words, the prior art Merck data sheets only teach the structure, composition and properties of the Merck pigments, which are a metal-oxide-coated silica platelet. They do not teach or suggest that it is possible to mix the

solid **silica-based** pigment particles of the Merck data sheets with a silicate frit, *as described by Eppler in examples 1 to 8 in columns 3 to 5*, e.g. with the composition of applicants' claim 19, as described in applicants' specification, to apply the mixture to a glass ceramic article, and then to fire the article with the coating on it at a high temperature of up to about 1000°C **while maintaining the integrity of the pigment particles**.

Eppler clearly teaches that special measures must be taken to incorporate mica-based pigments in a glass melt. For example in column 1, line 28, to column 1, line 37, Eppler states the following:

> "Unfortunately, the pearlescent pigments in these vitreous coating compositions dissolve during the firing process. As a result, the very purpose for incorporating the pearlescent pigments into the composition in the first instance, namely the aesthetic appearance of the fired object is not achieved.
>
> Attempts in the prior art to overcome this problem have not been satisfactory...."

Eppler overcomes these problems for a **mica-based** pigment, i.e. a pigment in which the core flake is a mica composition and the core flake is coated with a metal oxide, such as titanium dioxide. However it is well known that mica is much better at withstanding heat loads than silica. Eppler teaches that these problems are overcome by including uncoated mica as well as coated mica in the particulate that is dissolved in the melted glass flux and by using a suspending agent, as explained above in section 1.

Clearly one skilled in the art who is aware of the disclosures of Eppler and the other prior art of record would find that the fact that the applicants' coated

silica flakes (the pigments of Merck) do not dissolve in the silicate melt of claim 13 is surprising, especially without the use of special measures including using uncoated silica particles as well as the metal oxide coated silica particles and also using a suspending agent.

Although obviousness does not require absolute predictability, at least some degree of predictability is required. See M.P.E.P. 2143.03 and ***In re Rinehart***, 189 U.S.P.Q. 143(C.C.P.A. 1976). Here in the case of the instant claims 13 to 21 there is no reason to expect that it would even be possible maintain the titanium-dioxide-coated silica flakes described in the Merck prior art reference intact when they were mixed in a melted glass flux or silicate melt, such as that of claim 19.

One skilled in the art would expect the opposite from the disclosures in Eppler: he or she would expect the silica particle to eventually dissolve in the silicate melt, because silica particles would dissolve more easily than mica particles, especially if no special measures were used as explained in the disclosure in columns 2 to 4 of Eppler.

It is respectfully submitted that the disclosures in the prior art suggest that the applicants' claimed product of claims 13 to 21 is unexpected in view of the teachings of Eppler, et al, and the Merck Product Sheets.

For the foregoing reasons withdrawal of the rejection of claims 15, 16, and 18 as obvious under 35 U.S.C. 103 (a) over R. Eppler, et al, US Patent 5,783,506, in view of P. Bujard, US Patent 7,291,216, and further in view of

Merck in "COLORSTREAM T20-02 WNT Arctic Fire Product Information" is respectfully requested.

For the foregoing reasons withdrawal of the rejection of claims 15 and 17 as obvious under 35 U.S.C. 103 (a) over R. Eppler, et al, US Patent 5,783,506, in view of P. Bujard, US Patent 7,291,216, and further in view of Merck in "COLORSTREAM T20-03 WNT Tropic Sunrise Product Information" is respectfully requested.

Should the Examiner require or consider it advisable that the specification, claims and/or drawing be further amended or corrected in formal respects to put this case in condition for final allowance, then it is requested that such amendments or corrections be carried out by Examiner's Amendment and the case passed to issue. Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing the case to allowance, he or she is invited to telephone the undersigned at 1-631-549 4700.

In view of the foregoing, favorable allowance is respectfully solicited.

Respectfully submitted,

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